CLAIMS

1. An electricity generator exhibiting a functioning air gap radius extending from a generator axis, and drivably operable to generate maximum current, comprising:

a rotor having a sequence of generally arcuate regions of predetermined magnetization and confronting magnetic surface of principal dimension in parallel with said generator axis, said confronting magnetic surface being located in correspondence with said air gap radius and rotatable about said generator axis;

a stator core assembly having a select number of spaced core components formed of pressure shaped processed ferromagnetic particles which are generally mutually insulatively associated, each said core component being disposed about a radius extending from said generator axis, having a flux interaction surface located adjacent said rotor confronting magnetic surface defining an air gap and having a face length parallel with said generatorr axis and a face width selected to provide a magnetic field coupling, each said core component having a winding support region spaced from and in flux transfer communication with said flux interaction surface, having a winding region width generally normal to said radius and cross-sectional area attributes effective for conveyance of confronting magnetic flux without saturation when said generator is driven to generate said maximum current, and said stator assembly including a back iron assembly formed of pressure shaped processed ferromagnetic particles which are generally mutually insulatively associated, said back iron assembly being in flux transfer association with each said core component adjacent said winding support region and having cross-sectional area attributes effective for magnetic flux conveyance without saturation, said face width having a value less than about 2.5 times said winding region width; and

a field winding assembly including winding components located at each said core component and extending in electromagnetic flux coupling relationship about said winding support region, said winding components being electrically coupled with a generator output for providing generated current upon driven rotation of said rotor about said generator axis.

2. The generator of claim 1 in which:

each said core component flux interaction surface of said stator core assembly has a said face length which is about equal to said principal dimension of said rotor confronting magnetic surface.

3. The generator of claim 1 in which:

each said core component flux interaction surface of said stator core assembly has a principal dimension in parallel with said generator axis; and

each said core component winding support region has a principal dimension in parallel with said generator axis which is less than said face length of said flux interaction surface.

4. The generator of claim 3 in which:

said stator assembly back iron assembly has a principal dimension in parallel with said generator axis which is greater than said principal dimension of said winding support region.

5. The generator of claim 3 in which:

said stator assembly back iron assembly has a principal dimension in parallel with said generator axis which is most equal to the said principal dimension of said winding support region.

6. The generator of claim 1 in which:

each said core component includes an induction region extending in flux transfer relationship between said flux interaction surface and said winding support region and having a principal dimension in parallel with said generator axis which corresponds with said face length of said flux interaction surface.

7. The generator of claim 6 in which:

each said core component winding support region has a principal dimension in parallel with said generator axis which is less than said face length of said flux interaction surface.

8. The generator of claim 7 in which:

each said core component induction region is configured having first and second oppositely disposed, parallel induction region surfaces spaced apart said induction region principal dimension; and

each said core component winding support region is configured having first and second oppositely disposed, mutually parallel winding support region surfaces spaced apart said winding region principal dimension, arranged in parallel relationship and in adjacency with respective said first and second induction region

surfaces, and including a first forward coupling transition extending a first forward level-defining distance between said first winding support region surface and said first induction region surface.

9. The generator of claim 8 in which said forward level-defining distance is of an extent to maintain a said winding component below the level of said first induction region surface.

10. The generator of claim 8 in which:

each said core component includes a second forward coupling transition extending a second forward level defining distance between said second winding support region surface and said second induction region surface.

11. The generator of claim 8 in which:

said stator core assembly back iron assembly cross-sectional area has a back iron principal dimension in parallel with said generator axis, is configured having first and second mutually parallel back iron surfaces spaced apart said back iron principal dimension, arranged in parallel relationship and in adjacency with respective said first and second winding support region surfaces.

12. The generator of claim 11 in which:

said back iron principal dimension is equal to said winding region principal dimension.

13. The generator of claim 11 in which:

said back iron principal dimension is greater than said winding region principal dimension; and

including a first rearward coupling transition extending a first rearward, level-defining distance between said first winding support region surface and said first back iron surface.

14. The generator of claim 13 in which said first rearward level-defining distance is of an extent to maintain a said winding component below the level of said first back iron surface.

15. The generator of claim 13 in which:

each said core component includes a second rearward coupling transition extending a second rearward level-defining distance between said second winding support region surface and said second back iron surface.

16. The generator of claim 13 in which:

said first back iron surface is arranged in coplanar relationship with said first induction region surface.

17. The generator of claim 16 in which:

said second back iron surface is arranged in coplanar relationship with said second induction region surface.

18. The generator of claim 1 in which said stator assembly back iron assembly comprises:

a plurality of discrete back iron linking members each having at least two, spaced apart first back iron abutting surfaces;

a back iron extension region formed integrally with and extending from said winding support region of each said core component to at least two, spaced apart second back iron abutting surfaces arranged in interkeyed, abutting relationship with said first back iron abutting surfaces to define said stator assembly.

19. The generator of claim 18 in which said stator assembly includes a tensioning assembly surmounting each said core component flux interaction surface for effecting a compressive engagement of said first and second back iron abutting surfaces.

20. The generator of claim 19 in which said tensioning assembly is a compression ring.

21. The generator of claim 18 in which said stator assembly includes a tensioning assembly surmounting each said back iron linking member and back iron extension region for effecting a compressive engagement of said first and second back iron abutting surfaces.

22. The generator of claim 19 in which said tensioning assembly is a compression ring.

23. An electricity generator exhibiting an air gap radius extending from a generator axis and drivably operable to generate a maximum current, comprising:

a bearing support assembly;

a bearing mounted for rotation about said generator axis upon said bearing support assembly;

a rotor having a sequence of generally arcuate regions of predetermined magnetization and confronting surface of first principal dimension in parallel with said generator axis, mounted for rotation with said bearing, said

confronting magnetic surface being located in correspondence with said air gap radius;

a stator core assembly having a select number of spaced core components each being disposed about a radius extending from said generator axis, formed of pressure shaped processed ferromagnetic particles which are generally mutually insulatively associated, each said core component having an induction region of second principal dimension in parallel with said generator axis having a value close in value to the value of said first principal dimension, said induction region extending to an arcuate flux interaction surface located adjacent said rotor confronting magnetic surface to define an air gap and having a face length parallel with said generator axis and an arcuate face width generally normal to said radius, said face length exhibiting said second principal dimension selected to provide a coupling induction of the magnetic flux derived from said rotor regions of predetermined magnetization, each said core component having a winding support region extending in flux transfer communication from said induction region having a third principal dimension parallel with said generator axis, and a winding region width generally normal to said radius, and said stator assembly including a back iron assembly formed of pressure shaped processed ferromagnetic particles which are generally mutually insulatively associated, said back iron assembly being in flux transfer association with each said core component adjacent said winding support region;

a field winding assembly configured with multiple field turns, said field turns being located at each said core component and extending in electromagnetic flux coupling relationship about said winding support region, said field turns being coupled with a generator output for providing generated current upon driven rotation of said rotor upon said bearing; and

each said core component induction region and winding support region, and said back iron assembly having cross sectional area attributes effective for conveyance of magnetic flux derived from said regions of predetermined magnetization and from said field winding assembly without saturation at said maximum current.

24. The generator of claim 23 in which said face width has a value less than about 2.5 times the value of said winding region width.

25. The generator of claim 23 in which:

each said core component induction region is configured having first and second oppositely disposed, parallel induction region surfaces spaced apart said second principal dimension;

said third principal dimension is less than said second principal dimension; and

each said core component winding support region is configured having first and second oppositely disposed, mutually parallel winding support region surfaces spaced apart said third principal dimension, arranged in parallel relationship and in adjacency with respective said first and second induction region surfaces, and including a first forward coupling transition extending a first forward level-defining distance between said first winding support region surface and said first induction region surface.

26. The generator of claim 25 in which:

said back iron assembly has a fourth principal dimension paralleled with said motor axis; and

said second principal dimension is less than said fourth principal dimension.

27. The generator of claim 25 in which said forward level-defining distance is of an extent to maintain a said winding component below the level of said first induction region surface.

28. The generator of claim 25 in which:

each said core component includes a second forward coupling transition extending a second forward level defining distance between said second winding support region surface and said second induction region surface.

29. The generator of claim 25 in which:

said stator core assembly back iron assembly cross-sectional area has a fourth principal dimension in parallel with said generator axis, is configured having first and second mutually parallel back iron surfaces spaced apart said fourth principal dimension, arranged in parallel relationship and in adjacency with respective said first and second winding support region surfaces.

30. The generator of claim 29 in which:

said fourth principal dimension is equal to said third principal dimension.

31. The generator of claim 29 in which:

said fourth principal dimension is greater than said third principal dimension; and

including a first rearward coupling transition extending a first rearward, level-defining distance between said first winding support region surface and said first back iron surface..

32. The generator of claim 31 in which said first rearward level-defining distance is of an extent to maintain a said winding component below the level of said first back iron surface.

33. The generator of claim 31 in which:

each said core component includes a second rearward coupling transition extending a second rearward level-defining distance between said second winding support region surface and said second back iron surface.

34. The generator of claim 31 in which:

said first back iron surface is arranged in coplanar relationship with said first induction region surface.

35. The generator of claim 34 in which:

said second back iron surface is arranged in coplanar relationship with said second induction region surface.

36. The method of forming a stator and field winding assembly for an electromotive device having a rotor supporting a multiple pole permanent magnet assembly drivably rotatable about a motor axis, comprising the steps of:

(a) providing a predetermined number of core components, each being formed of pressure shaped processed ferromagnetic particles which are generally mutually insulatively associated, each said core component having an induction region extending along a radius from said axis to an arcuate flux interaction surface, said induction region extending to and being integrally formed with a winding support region of predetermined winding region width, said winding support region extending to and being integrally formed with a back iron extension region having two, spaced apart core component back iron abutting surfaces;

(b) providing a predetermined number of discrete back iron linking members each having two, spaced apart linking abutting surfaces and each being formed of pressure shaped processed ferromagnetic particles;

(c) positioning a core component winding over said winding support region; and

(d) then attaching said back iron linking members to said core components in a manner wherein said back iron abutting surfaces are in intimate abutting contact with said linking abutting surfaces.

37. The method of claim 36 in which:

said step (c) of positioning a core component winding over said winding support region includes the step of:

(c1) providing an electrically insulative bobbin;

(c2) winding a predetermined number electrically conductive wire turns upon said bobbin; and

(c3) inserting said bobbin with said wound wire turns over said winding support region by insertion over said back iron extension region.

38. The method of claim 36 in which said step (d) is carried out by adhesively joining said back iron abutting surfaces with said linking abutting surfaces.

39. The method of claim 36 in which said step (d) for attaching said back iron linking members to said core components includes the steps of:

(d1) providing a tensioning assembly; and

(d2) positioning said tensioning assembly over each said core component flux interaction surface to effect a compressive abutment of said back iron abutting surfaces against said linking abutting surfaces.

40.. The method of claim 36 in which said step (d) for attaching said back iron linking members to said core components includes the steps of:

(d1) providing a tensioning assembly; and

(d2) positioning said tensioning assembly over each said core component back iron linking member and back iron extension region to effect a compressive abutment of said back iron abutting surfaces against said linking abutting surfaces.

41. An electricity generator, comprising:

a rotor rotatable about a generator axis having a sequence of generally arcuate regions of predetermined magnetization and confronting magnetic surface of first principal dimension in parallel with said generator axis;

a stator core assembly having spaced core components formed of pressure shaped processed ferromagnetic particles which are generally mutually insulatively associated, each said core component having an induction region of second principal dimension in parallel with said generator axis between first and

second induction region surfaces and extending to an arcuate flux interaction surface located adjacent said rotor confronting magnetic surface to define an air gap and having a face length parallel with said generator axis of value about equal to said first principal dimension, said induction region extending to an integrally formed winding support region having oppositely disposed first and second support region surfaces spaced apart a third principal dimension less than said second principal dimension, a first forward coupling transition extending a first forward level-defining distance between said first winding support region surface and said first induction region surface, and including a back iron assembly formed of pressure shaped processed ferromagnetic particles which are generally mutually insulatively associated, said back iron assembly being in flux transfer association with each said core component adjacent said winding support region and having a fourth principal dimension parallel with said generator axis extending between first and second spaced apart back iron surfaces; and

a field winding assembly including winding components located at each said core component and extending in electromagnetic flux coupling relationship about said winding support region, said winding components being coupled with a generator output for providing generated current upon driven rotation of said rotor about said generator axis.

42. The generator of claim 41 in which said forward level-defining distance is of an extent to maintain a said winding component below the level of said first induction region surface.

43. The generator of claim 41 in which:

each said core component includes a second forward coupling transition extending a second forward level defining distance between said second winding support region surface and said second induction region surface.

44. The generator of claim 41 in which:

said back iron principal dimension is equal to said winding region principal dimension.

45. The generator of claim 41 in which:

said back iron principal dimension is greater than said winding region principal dimension; and

including a first rearward coupling transition extending a first rearward, level-defining distance between said first winding support region surface and said first back iron surface.

46. The generator of claim 45 in which said first rearward level-defining distance is of an extent to maintain a said winding component below the level of said first back iron surface.

47. The generator of claim 45 in which:

each said core component includes a second rearward coupling transition extending a second rearward level-defining distance between said second winding support region surface and said second back iron surface.

48. The generator of claim 45 in which:

said first back iron surface is arranged in coplanar relationship with said first induction region surface.

49. The generator of claim 48 in which:

said second back iron surface is arranged in coplanar relationship with said second induction region surface.

50. The generator of claim 41 in which said stator assembly back iron assembly comprises:

a plurality of discrete back iron linking members each having at least two, spaced apart first back iron abutting surfaces;

a back iron extension region formed integrally with and extending from said winding support region of each said core component to at least two, spaced apart second back iron abutting surfaces arranged in interkeyed, abutting relationship with said first back iron abutting surfaces to define said stator assembly.